(46) Find all prime #'s p for which $x^3+x^2+x-p=0$ has at least 1 rational root. Find real roots.

NOTES

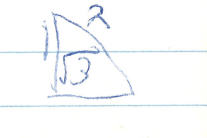
$\text{cis}\,x = \cos x + i\sin x$

$r_1\text{cis}\,\theta_1 \cdot r_2\text{cis}\,\theta_2 = r_1 r_2\,\text{cis}(\theta_1+\theta_2)$

$4\,\text{cis}\,30 \cdot 2^{\frac{1}{2}}\text{cis}\,\cancel{60}\,2$ $\quad z_1 = 5\text{cis}\,48$ $\quad z_2 = 10\text{cis}\,12$

$z_1 z_2 = 50\,\text{cis}\,60$

$\frac{4}{2}\,\text{cis}\,30 - 2^{\frac{3}{2}}\text{cis}\,30$ $\quad z_1/z_2 = \frac{1}{2}\,\text{cis}\,36$



$(5\,\text{cis}\,\frac{\pi}{3})^3 = 5^3\,\text{cis}\,\frac{3\pi}{3}$ $\quad (x\,\text{cis}\,y)^2 = x^2\,\text{cis}\,y2$

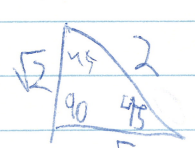
$\sqrt{2}(\text{cis}$

$\sqrt{3}(\text{cis}\,135) = \frac{\sqrt{3}}{3}\left(\frac{-\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}\right) - \frac{\sqrt{6}}{6} + i\frac{\sqrt{6}}{6}$

$12\,\text{cis}\,\frac{\pi}{6} = 12\left(\cos\frac{\sqrt{3}}{2} + i/2\right) = 6\sqrt{3} + 6i$

Demoivre's $(a+bi)^n = r^n(\cos n\theta + i\sin n\theta)$ $\quad N$ = Counting #

$\left(-\sqrt{2}+i\sqrt{2}\right)^5$



$\left(2\left(\text{cis}\,\frac{3\pi}{4}\right)\right)^5$

$2^5\left(\text{cis}\,\frac{15\pi}{4}\right)$

$32\left(\cos\frac{15\pi}{4} + i\sin\frac{15\pi}{4}\right)$

$32\left(\cos\frac{7\pi}{4} + i\sin\frac{7\pi}{4}\right)$

$32(\cos 45 - i\sin 45)$

$32\left(\frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2}\right)$

$16\sqrt{2} - 16i\sqrt{2}$

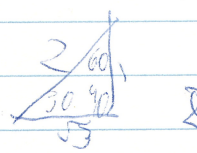
$\left(\sqrt{3}\,\text{cis}\,70\right)^3$

$(\sqrt{3})^3 = 3\sqrt{3}(\cos 210 + i\sin 210)$

$3\sqrt{3}(-\cos 30 + i\sin 30)$

$3\sqrt{3}\left(\frac{-\sqrt{3}}{2} - \frac{1}{2}\right)$

$-9/2 - \frac{3\sqrt{3}}{2}$



$2($

$2(\cos 300 + i\sin 300) = 1024\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i\right)$

$512\sqrt{2} + 512\sqrt{2}i$

$512 - 512i\sqrt{3}$

COMPLETE $\square$ $x^2+bx+\left(\frac{b}{2}\right)^2$